

# Knowledge Web (K-Web): Use by CARGRU THREE aboard the USS Carl Vinson During Operation Enduring Freedom



**SPAWAR Systems Center, San Diego**  
**Jeffrey G. Morrison, Ph.D.**  
[jmorriso@spawar.navy.mil](mailto:jmorriso@spawar.navy.mil)



**Pacific Science & Engineering Group**  
**Ronald Moore**  
[ramoore@pacific-science.com](mailto:ramoore@pacific-science.com)

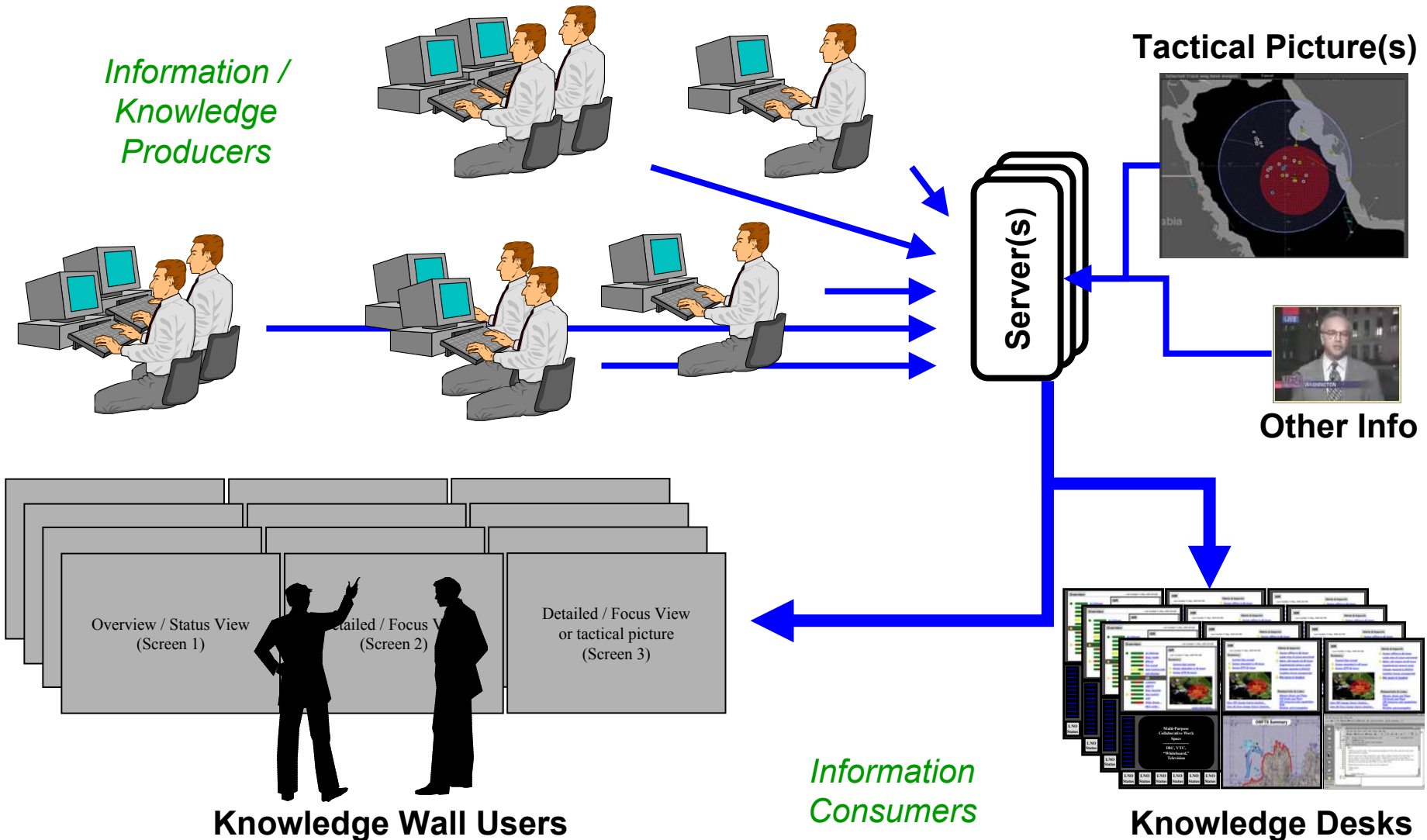
# What is the Knowledge Web? (K-Web)

- ◆ ONR Sponsored Project, SSC-SD Implemented
- ◆ Basic Concept is to capture the value-added information products (i.e., Knowledge) already being created by the command staff
  - Use as many existing information products as possible (vice creating special purpose web-pages)
  - Supplement or replace traditional 8-hour briefs with “anytime, anywhere, always available,” mission-relevant information
- ◆ Store and present this Knowledge in an easily accessible store – a “Knowledge Web”
- ◆ Knowledge Web can be organized dynamically to meet warfighter needs – often along mission or warfare areas, or component commands

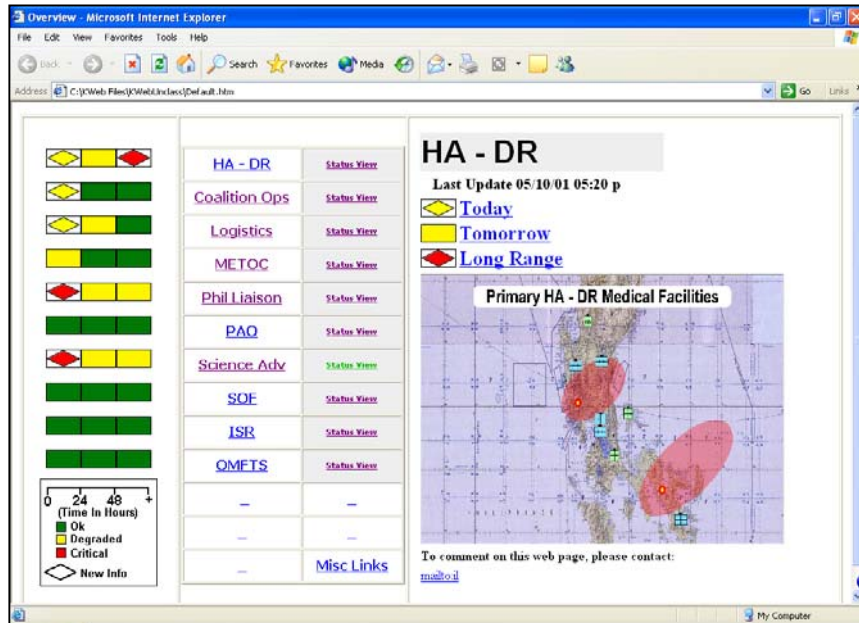
# What Knowledge Web is NOT!

- ◆ Not a specific technology (*rather, it is a Concept of Operations and associated prototype tools; K-Web can be implemented using a variety of technologies*)
- ◆ Not yet widely deployed (*currently, CCG-3 / USS Carl Vinson has been the only fleet user*)
- ◆ Not yet a “finished” product (*R&D, and transition efforts are still underway...*)
- ◆ Not a “real-time” tactical tool (*though it strongly supports near real-time decision making...*)

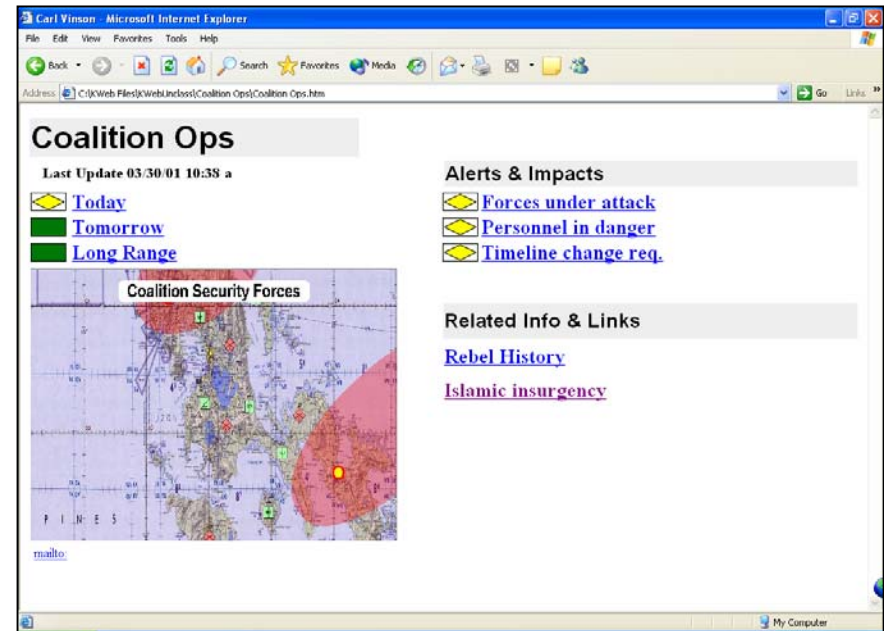
# Knowledge Web Concept



# Typical K-Web Products



K-Web Overview Page



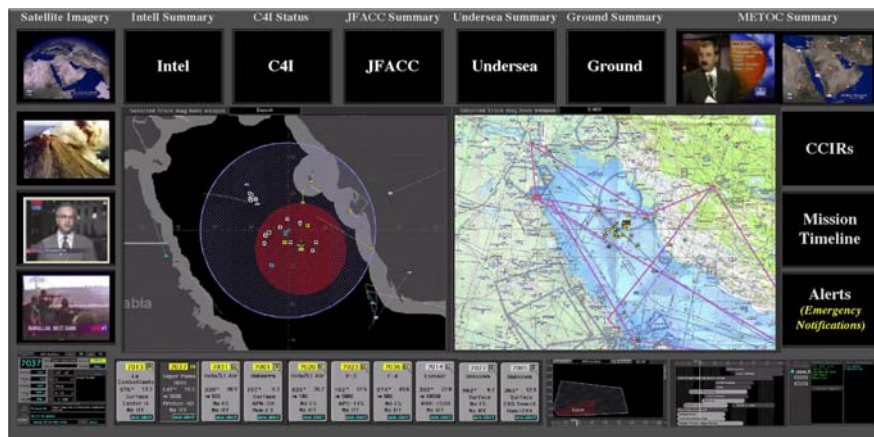
Helicopter delivery of medical supplies has been suspended until further notice in the area west of [Mt. Mayon](#).

Summary and Lower-level Content Pages



# Knowledge Walls (K-Wall)

as installed at the Naval War College



**Command 21  
Knowledge Wall  
Conceptual Design  
(ca 1999)**

**Global 2000  
Knowledge Wall**



**Global 2001  
Knowledge Wall**



# USS Carl Vinson's TFCC

**CNAP  
Video Wall**  
(Integrating SSC-SD  
Knowledge Wall concepts  
and technologies)



**SSC-SD provided  
3 Knowledge Desks**

# USS Carl Vinson / CCG-3 K-Web Timeline

<b>Oct 1999</b>	<b>K-Web development begins – C3F Requests accelerated development for Global 2000</b>
<b>Aug 2000</b>	<b>CCG-3 participates in Global 2000 War Game</b>
<b>Oct 2000</b>	<b>CCG-3 requests K-Web installation</b>
<b>Apr 2001</b>	<b>K-Web tools approved for use aboard ship</b>
<b>May 2001</b>	<b>K-Web / K-Desk installed onboard USS Carl Vinson</b>
<b>Jul 2001</b>	<b>USS Carl Vinson / CCG-3 deploys</b>
<b>Sep 2001</b>	<b>Terrorist attack on World Trade Center / Operation Enduring Freedom begins</b>
<b>Jan 2002</b>	<b>USS Carl Vinson / CCG-3 returns from deployment</b>



# K-Web Assessment Goals Aboard USS Carl Vinson

## ◆ Use

- How was it being used?
- Who was using it and where?
- How often was it used?

## ◆ Utility

- Did it meet users' needs?
  - » If so, did it do so adequately?

## ◆ Usability

- Where there usability problems?

What  
improvements  
are needed?  
What are the  
“hard” issues?

# Data Collection

- ◆ Automated data collection
  - SumMaker and TacGraph tools record use
  - Microsoft IIS web server tracks use
- ◆ Interviews and discussions
  - Post workup
  - Early deployment
  - Late deployment
  - Post deployment
- ◆ Anecdotal reports
  - Continuous and ongoing...

# K-Web Highlights

## K-Web Experienced Significant Use During Operation Enduring Freedom!



- ◆ Access during analysis period:
  - 2684 unique IP addresses\* accessed K-Web server during analysis period
  - 1322 visitors\* visited K-Web more than once
  - 1755 visitors\* bookmarked K-Web content for future access
- ◆ Activity per day:
  - Average of 482 visitors\* per day
    - » Ranged from 340 – 676 per day.
  - Info flow / data transfer
    - » Average data transferred per day (444.45 MB)
    - » Vast majority of data transfers took place “in-house” (over ship’s internal network)
      - ◆ Graphics / photos / imagery
      - ◆ Multi-media / movie files
    - » No discernable impact upon the network was reported by users in spite of the large amount of data transferred

\* See speaker notes for important information on the terms “IP Address,” “user,” and “visitor.”

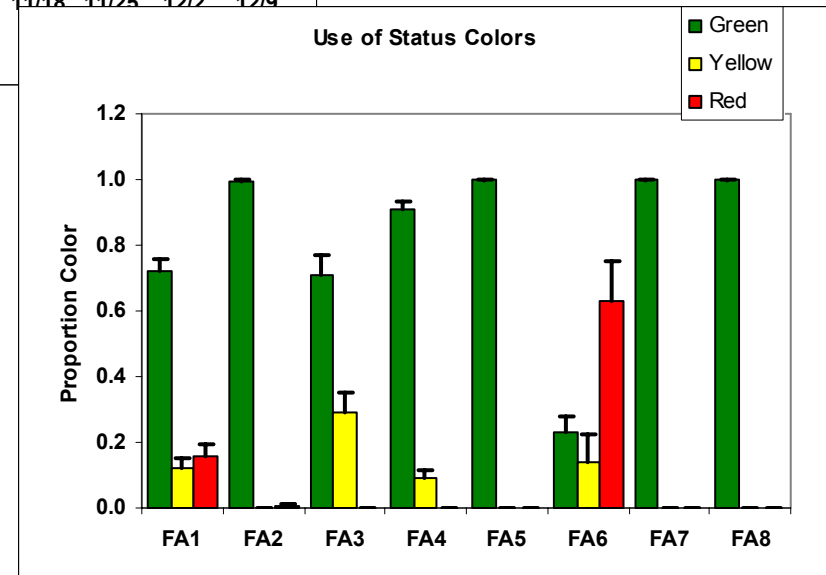
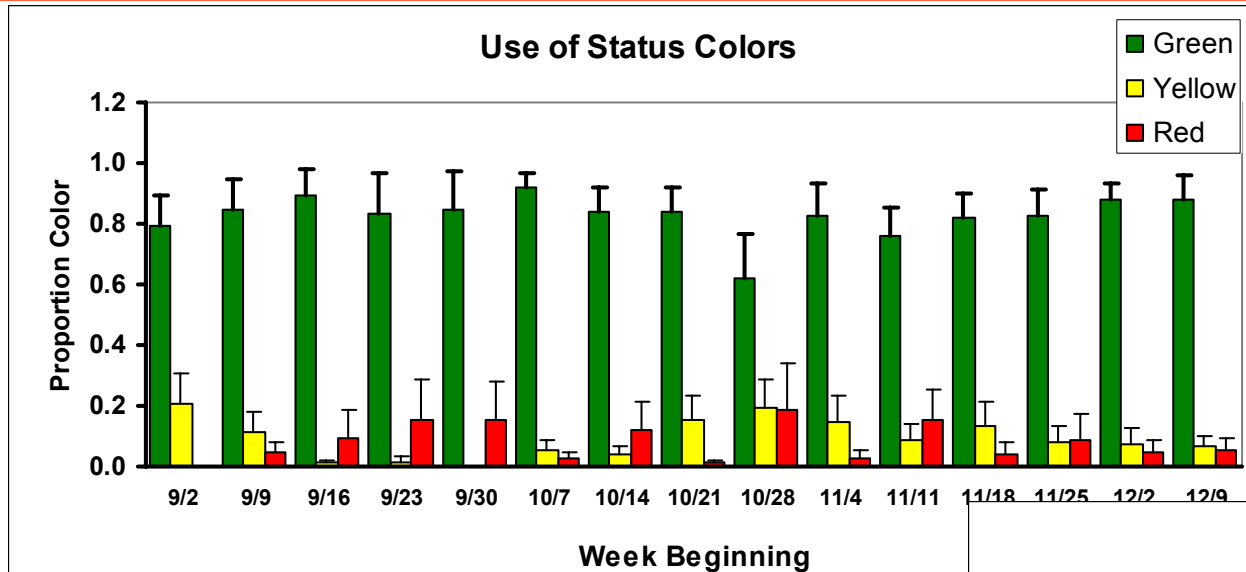
# K-Web Users

- ◆ Most K-Web users internal to USS Carl Vinson (CCG-3 staff)
- ◆ Many other Commands accessed / viewed / provided links to the K-Web

*(based on unique Domain names / IP addresses accessing K-Web)*

- Carl Vinson BG
- 5<sup>th</sup> Fleet
- 7<sup>th</sup> Fleet
- Various METOC commands
- CENTCOM
- Collaboration at Sea systems
- CINCPACFLT
- Peleliu ARG
- Theodore Roosevelt BG
- SOCOM
- NAVCENT
- USS Blue Ridge
- Various Pentagon offices / users, multi-service
- Enterprise BG
- Essex ARG
- DIA
- PACOM
- II MEF
- 15 MEU
- Various Air Force Commands
- *Numerous Commands listed by IP address only...*

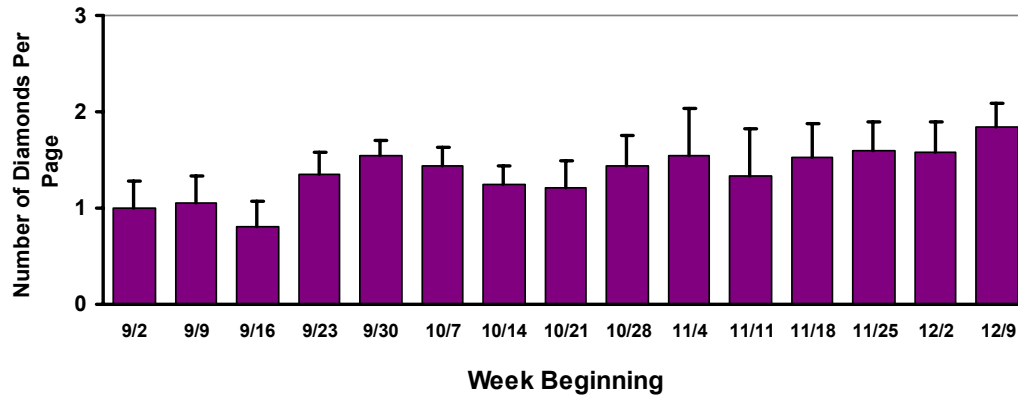
# Use of Colors to Indicate Status



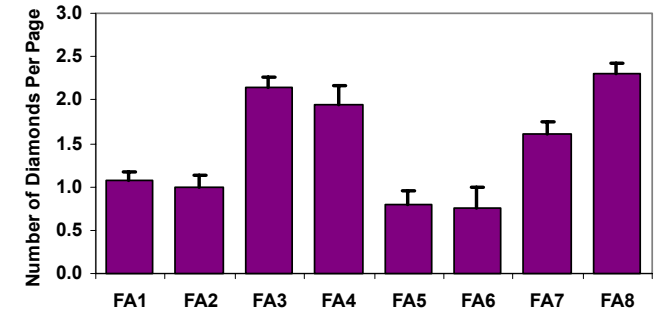


# Alerting Users to Change

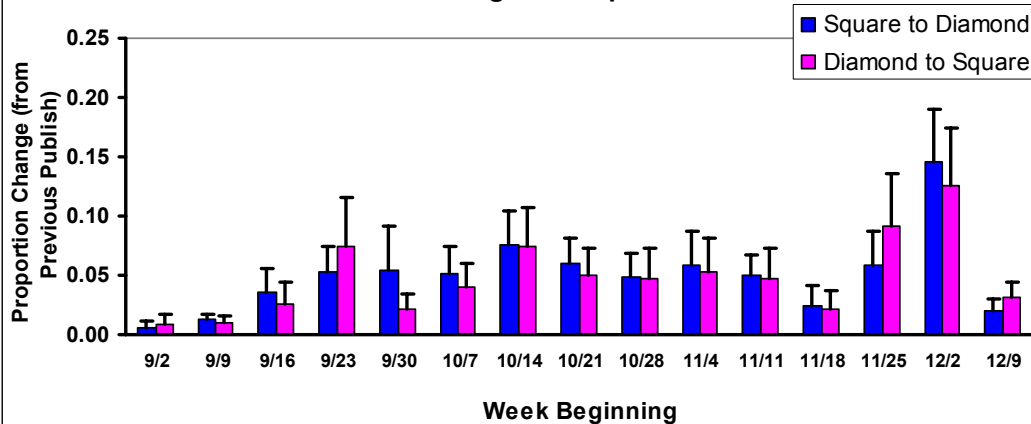
Inclusion of Change Diamonds on Summary Pages



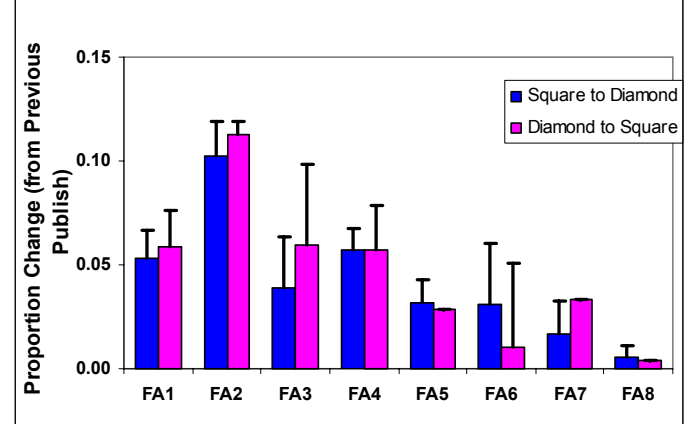
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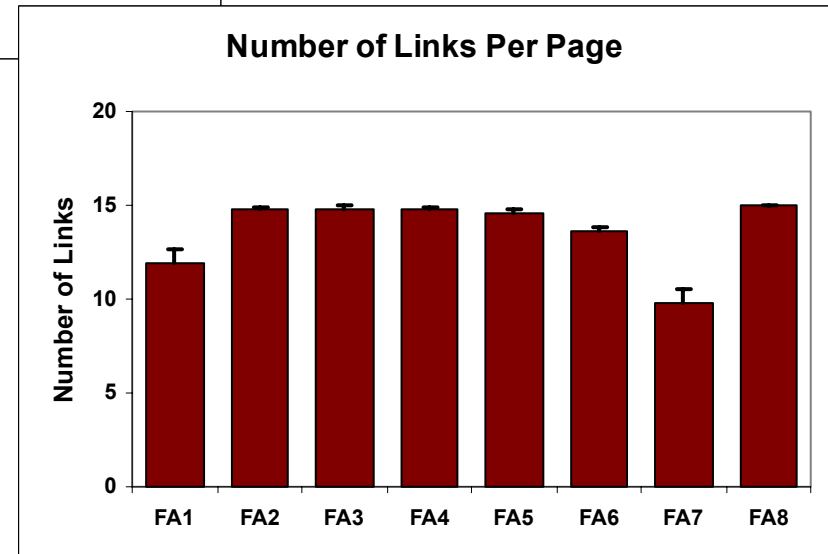
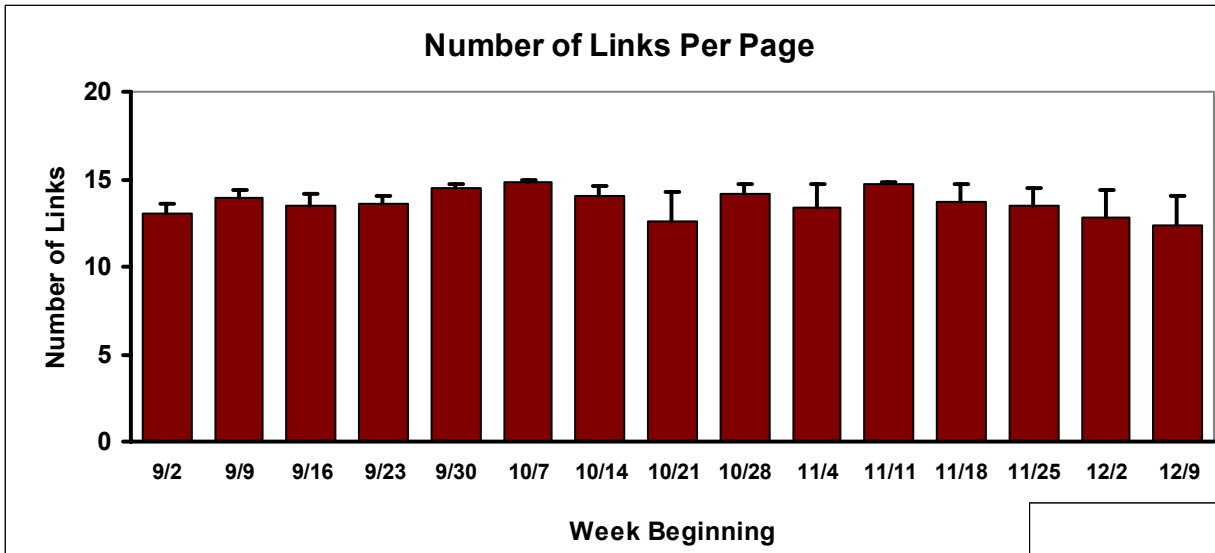
Change in Shape



Change in Shape



# Web of Info – Linking to Mission-Relevant Information



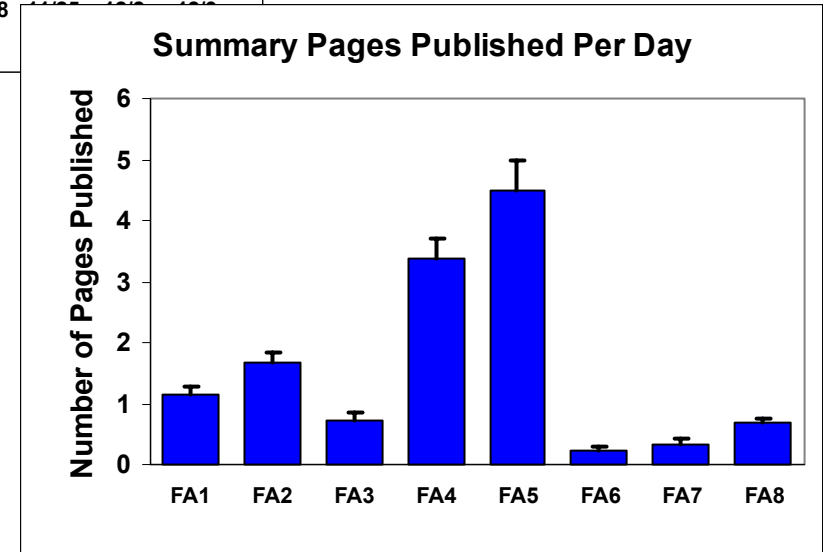
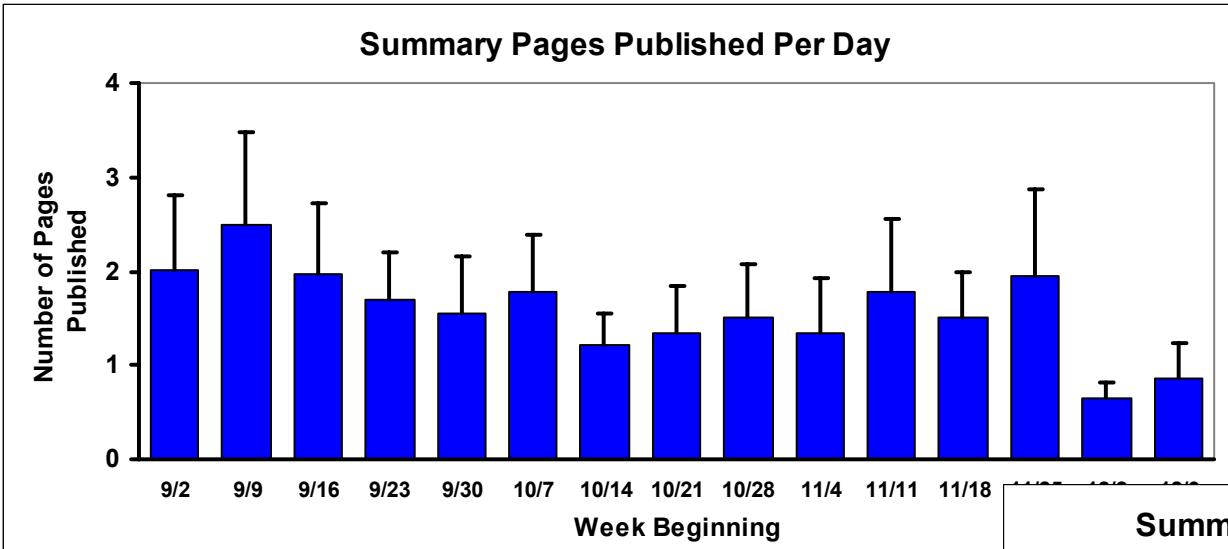


SPAWAR  
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# Near Real-Time Data

## Publish Rates of Top-Level Summary Pages



# Operational Impact of K-Web

## Selected Quotes from K-Web Users

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- ◆ K-Web was up and operational the entire deployment – not a single failure...
- ◆ Structure was good... content was good... it was what they needed, when they needed it...
- ◆ During morning meetings we focused on problem solving rather than reviewing PowerPoint briefs...
- ◆ K-Web was so powerful because you could find the information you needed with just a click or two – not like other (traditional) systems...
- ◆ So easy to keep updated... We used it as a near-real time tool...
- ◆ K-Web and chat filled the bill... We didn't even notice when radio circuits went down – because we weren't using them!

# More Operational Quotes regarding K-Web

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- ◆ K-Web Tool Training was easy – 15-30 minutes tops!
- ◆ This was an operator's dream – way better than other systems I've used...
- ◆ Used K-Web and Chat as primary communications channel – never did use BG Command (verbal communications circuit)
- ◆ Using K-Web meant breaking old habits and actually sharing information with others – K-Web and SumMaker made that easy...
- ◆ Very little resistance to K-Web – took about one day to adopt at the Command- and staff-levels
- ◆ Never did a PowerPoint brief during the deployment. K-Web was a huge time-saver!



# But... Some Issues Remain

## Selected Quotes from K-Web Users

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- ◆ ...became so useful, so quickly, that the entire region became dependent on it... When it came time to leave, it left a huge information vacuum. K-Web was almost *too good* – need a way to provide continuity between battle groups...
- ◆ Some units couldn't always see the K-Web due to connectivity and bandwidth limitations
  - Smaller ships, submarines, etc.
- ◆ So many viewers outside the command (even outside the region!)... Who do you create content for and how do we control access?
- ◆ No easy way to share K-Web with the Coalition Forces
  - Hardest part wasn't the technology – it was knowing *what* to share and *how* to share it...(Policy issues versus Technology issues!)
- ◆ Tools were great, but room for improvements...
- ◆ K-Web was so useful and used, it raised the Admiral's expectations regarding sharing and using knowledge within the staff. We have to think "outside the box" and work harder to integrate our stuff with others'...

# Impact of K-Desks and Wall

## Selected Quotes from Users

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- ◆ Multi-head display systems [*K-Desks in TFCC*] were a huge help – key enabler in managing all of the different information sources and multiple chats
  - Users reported monitoring up to 8 chat sessions simultaneously on the K-Desks. Users with traditional workstations unable to chat effectively and do any other tasks.
  - K-Desks could accommodate simultaneous inputs from multiple tactical and information management systems
- ◆ “6-headed monsters” (as they were affectionately called) were a huge improvement over old display systems. Command-level watch standers need all the display space they can get...
- ◆ Fantastic tool – always up – no maintenance – easy to use – we’d never give these up!
- ◆ Having the K-Web available on the VideoWall side by side with tactical data was powerful. We could see the “big picture” and the fine details at the same time... Really helped us get S.A.

# Important K-Web Principles

## ◆ Flexibility

- K-Web must be easily and rapidly adaptable to warfighters' changing needs
  - » Form
  - » Content
  - » Web / knowledge structure

## ◆ Ease of Use

- Intuitive and easy-to-use
  - » Information production
  - » Information consumption
    - ◆ Limit required user interaction to the extent possible

## ◆ Economy of Effort

- Leverage off of information tools and products already being used / produced
  - » Outlook / Exchange, Word, Excel, PowerPoint, Access, various graphics, multimedia, others' web sites / content, etc.
  - » Limit production of specialty products
- Require little or no maintenance by IT personnel

# More K-Web Principles (2)

- ◆ Adopt concept of economical “pull” versus blind “push”
  - Use “Smart Push” as supplement
- ◆ Limited Training Requirement
  - Familiarity with MS Windows and Office applications assumed
  - Specialized “web master” knowledge not required
  - Training materials and QRGs available and easy-to-use
- ◆ Focus on Concept vice Technology
  - K-Web concept not tied to specific tools or technologies
  - K-Web concept should remain viable long after specific tools / technologies become obsolete

# More K-Web Principles (3)

- ◆ Focus on continuous Shared SA for Decision Support
  - Continuous posting as situation evolves
  - All users maintain broad situation awareness
  - Producers provide value-added analysis of their domain to help others understand current status and its implications
  - Consumers further fuse/integrate info across domains
  - Result: Problem-oriented organization of knowledge
- ◆ Key is Process
  - Guided by business rules
  - Tailored to particular user and missions
  - Easily adaptable by users as needs change
  - Simple organization of information-minimize levels
  - Detail available through drill-down
  - Use of links to minimize redundant production



- ◆ Systems approach to command center and C4I design is critical!
  - Must include thorough understanding of *users'* requirements up front.
  - Design must address business rules and practices and have endorsement of the command.
  - The effectiveness of combining K-Desks, K-Web, Chat GCCS-M and traditional databases were greater than the sum of the parts.
  - Rapid prototyping and real-time operational performance metrics critical to success.
- ◆ There is much work left to be done ....

# Research Issues To Be Resolved...

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- ◆ Theory / Tools to Improve Knowledge transaction
  - Tracking Requests for information
  - Information produced / made available compared to utilization
  - Collaboration Support Tools and utilization
- ◆ Representing change and implications within a store of information
- ◆ Accommodating differences in information requirements between different echelons / (types of consumers)
- ◆ Knowledge Management of large stores of information and
- ◆ Strategies for Knowledge Representation

# K-Web Future Enhancements

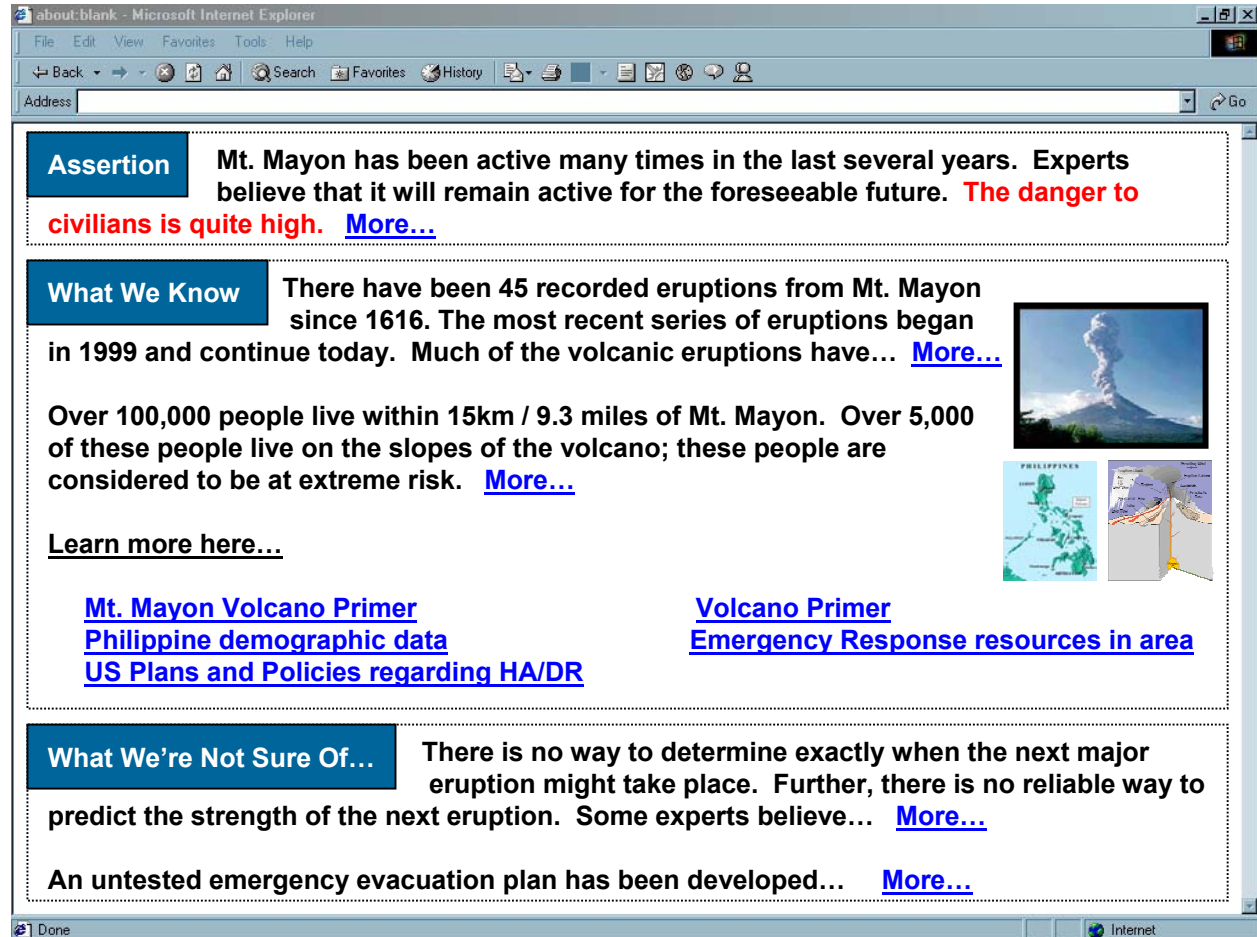
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- ◆ Additional templates to facilitate rapid & consistent information production and “story building”
- ◆ Agents to off-load user of time-consuming K-Web administrative tasks
- ◆ Advanced, web-based change awareness and status alerting technologies
- ◆ Advanced visualizations of K-Web space to facilitate navigation & assimilation
- ◆ Agents to tailor content to different classes of users and afford improved Bandwidth Management
- ◆ Tools to facilitate integration of K-Web with tactical data systems

# Additional K-Web Templates

## Example: StoryBuilder

- ◆ Information is structured such that it forms the basis of an “argument” or “story”
- ◆ Embedded links take the viewer to more detailed information supporting the assertion, facts, and conclusion.



about:blank - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites History

Address

**Assertion** Mt. Mayon has been active many times in the last several years. Experts believe that it will remain active for the foreseeable future. **The danger to civilians is quite high.** [More...](#)

**What We Know** There have been 45 recorded eruptions from Mt. Mayon since 1616. The most recent series of eruptions began in 1999 and continue today. Much of the volcanic eruptions have... [More...](#)

Over 100,000 people live within 15km / 9.3 miles of Mt. Mayon. Over 5,000 of these people live on the slopes of the volcano; these people are considered to be at extreme risk. [More...](#)

[Learn more here...](#)

[Mt. Mayon Volcano Primer](#)  
[Philippine demographic data](#)  
[US Plans and Policies regarding HA/DR](#)

[Volcano Primer](#)  
[Emergency Response resources in area](#)

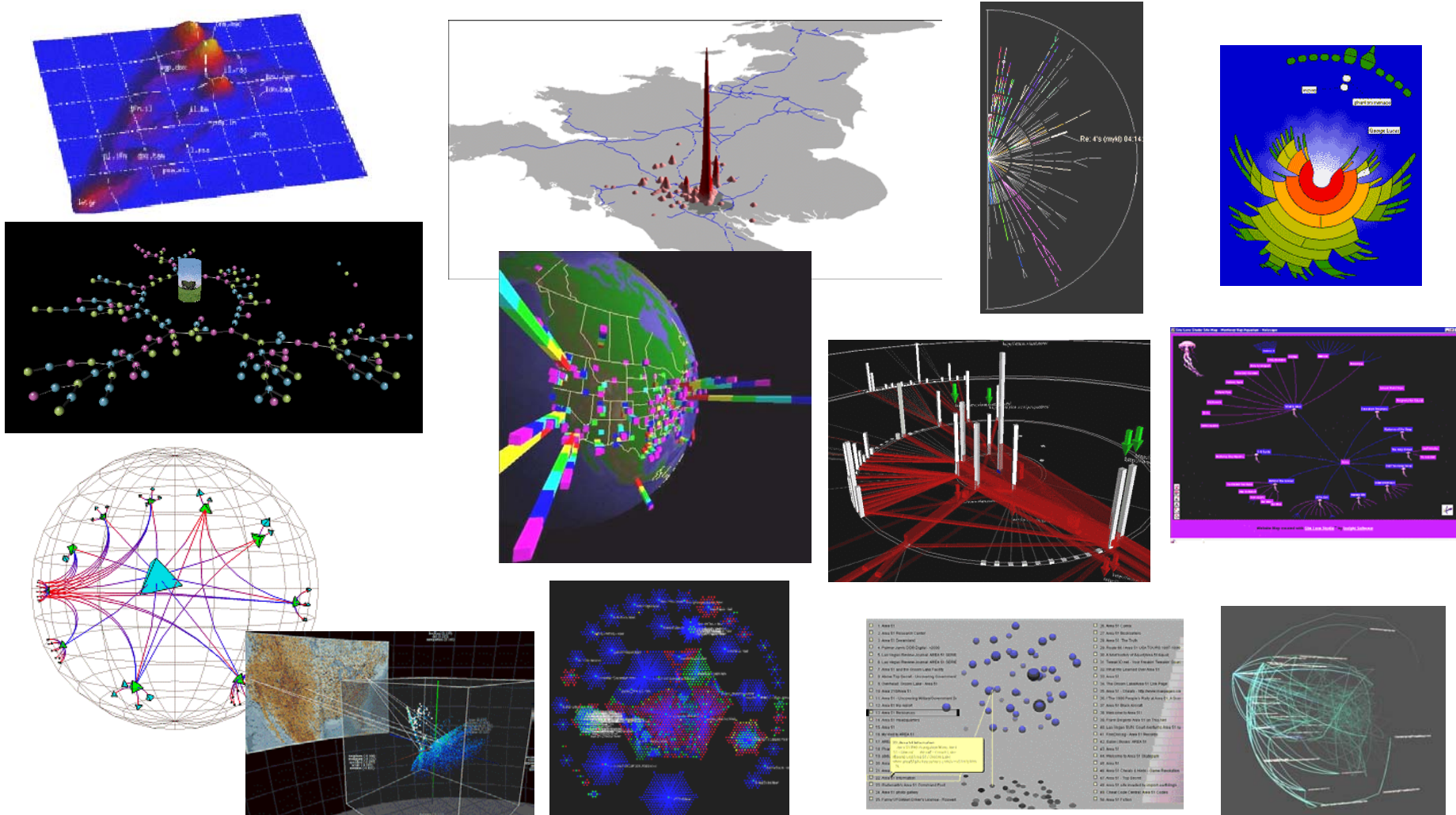
**What We're Not Sure Of...** There is no way to determine exactly when the next major eruption might take place. Further, there is no reliable way to predict the strength of the next eruption. Some experts believe... [More...](#)

An untested emergency evacuation plan has been developed... [More...](#)

Done Internet

# Advanced Visualizations and Multi-Dimensional Information Representations

(available in open literature\*)



\*See <http://www.cybergeography.org/atlas/atlas.html> for copyright and attribution information



# Summary

- ◆ K-Web was used effectively aboard USS Carl Vinson during Operation Enduring Freedom
  - As anecdotally reported, K-Web use was directly correlated to:
    - » Improved speed of command
    - » Enhanced Situation Assessment
    - » Increased interaction between functional areas
- ◆ Issues were identified for future research and development
  - Underlying concepts being further addressed / explored via current and future ONR's Command 21 research project
  - Transition efforts taking place under ONR's KWT FNC program
- ◆ K-Web being transitioned to Fleet systems ASAP via SPAWAR PD-15 using ONR FNC Funding.



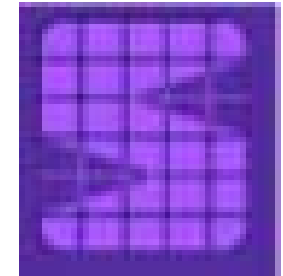
# Command 21 K-Web Team



**SPAWAR  
Systems Center  
San Diego**



**Pacific Science  
& Engineering**



**Sonalysts, Inc.**

**For more information, contact:**



**SPAWAR  
Systems Center  
San Diego**

**Jeffrey Morrison, Ph.D.**  
[jmorriso@spawar.navy.mil](mailto:jmorriso@spawar.navy.mil)  
(619) 553-9070



**Pacific Science  
& Engineering**

**Ronald Moore**  
[ramoore@pacific-science.com](mailto:ramoore@pacific-science.com)  
(858) 535-1661

End

**For more information, contact:**